

Work Order ID 74993

October-14-11 10:38:46 AM

74993

Page 1

Item ID: D212-664-107

Accept

N900040100

Setup Start ***NS1***

Revision ID:

Item Name: Crosstube Low Standard Fwd

Stop ***NS2***

Start Date: 14/10/2011 Start Qty: 1.00

1

Cust Item ID:

Required Date: 03/11/2011 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: MLJ

Date: 11/10/14 Tooling:

Date:

Run Start ***NR1***

QC:

Date:

SPC (Y/N):

Date:

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr

Revision Nbr

D212-664-147

Rev B (DEO)

100

0.00

100

DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-107 CHG002

8-10-17

MLJ 11-10-27

110

0.00

110

Packaging

Packaging

Memo

0.00

Packaging

JW

11-10-18

120

0.00

120

BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-107 using CNC bender program 212-107

JW

11-10-18

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

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Start Date: 14/10/2011 Start Qty: 1.00

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1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	QC15- Crosstube Dimensional Check	0.00							
130									
QC	Memo	0.00							
Quality Control									
140		0.00							
140									
Crosstubes	Memo	0.00							
Crosstubes	1-Cut tube as per inspection dwg and deburr ends. ***ensure saw is square***								
	2-Position cuffs on tube ensure proper positioning								
	3-Drill tube as per dwg using DT8577 location #7 & # 212 ULF using jig DT8548 and DT8549 as per QSI 10								
	4-Transfer drill rivet holes from cuff into tube.								
	5-Identify cuff position and Batch # on each and identify tube as per dwg D212-664-107.								
	6- Inspect surface damage								
	7- Deburr and realodine cuff.								

JW 11-10-19

BT 11-10-20

7 MD

11/10/20

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Item Name: Crosstube Low Standard Fwd

Stop ***NS2***

Start Date: 14/10/2011 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 03/11/2011 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150 *150* HandFXtube Hand Finishing Crosstubes	Crosstubes Chemical Conversion Memo	0.00 MC 0.00	11/10/20						
160 *160* QC Quality Control	QC3- Inspect Part Finish Memo	0.00 0.00						85 11-10-24	
170 *170* QC Quality Control	QC5- Inspect part completeness to step on W/O Memo	0.00 0.00						11 10 24 ①	



POSITIVE RECALL
EFFECTIVE 11/10/11 AUTH [Signature]
RELEASED _____ DATE _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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October-14-11 10:38:46 AM

74993

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Accept

N900040100

Setup Start *NS1*

Stop *NS2*

Start Date: 14/10/2011 **Start Qty:** 1.00 ***1***

Cust Item ID:

Required Date: 03/11/2011 **Req'd Qty:** 1.00 *** 1 ***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

180 Outsource process - NDT per QSI038 4.1

0.00

180

0.00

Outsource2

Memo

Outsource process - NDT

Liquid Penetrant Inspection as per QSI 038Or
Issue P/O: 15240 MPI as per ASTM 1417
Level 2 Attach copy of NDT results to work order

190	0.00
-----	------

190

Packaging

Packaging

Memo

Packaging

Ensure copy of NDT results attached to work order.

200	QC5- Inspect part completeness to step on W/O	0.00
-----	---	------

200

OC

Memo

Quality Control

Inspect for damage & ensure results are as per Dwg D212-664-107

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Item ID: D212-664-107

Accept

N900040100

Setup Start ***NS1***

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Item Name: Crosstube Low Standard Fwd

Stop ***NS2***

Start Date: 14/10/2011 Start Qty: 1.00

1

Cust Item ID:

Required Date: 03/11/2011 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	Crosstubes	0.00							
210									
Crosstubes	Memo	0.00							
Crosstubes	1-Rivet Cuffs as per Dwg D212-664-147. with Sika flex in Between tube & Cuff A/R SIKAFLEX -241/-291 BATCH: <u>118393</u>								
220	SprayPaint	0.00							
220									
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside and outside crosstube as per QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2 PRIME: Start Time: <u>1030</u> Finish Time: <u>1130</u> PAINT: Start Time: <u>330</u> Finish Time: <u>430</u>								

W/O:		WORK ORDER CHANGES					
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October-14-11 10:38:46 AM

Item ID: D212-664-107 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: Stop ***NS2***
 Item Name: Crosstube Low Standard Fwd
 Start Date: 14/10/2011 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 03/11/2011 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230 *230* QC Quality Control	QC14- Inspect Spray Paint Memo Wrap in plastic bag to protect from scratches	0.00 0.00							
240 *240* Crosstubes Crosstubes	Crosstubes Memo 1- Assemble as per Dwg D212-664-147 1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper, clean the area with 4105S wash 'n' wipe 2-Install supports with Proseal 890 per DSI9563 and QSI 015 A/R Proseal 890 Batch <u>118234</u> 3- Torque bolts as per dwg <u>11/10/27</u>	0.00 0.00							

85 11-10-25
11 10/26/11

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

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N900040100

Setup Start *NS1*

Stop *NS2*

Reference:

Run Start *NR1*

Stop *NR2*

0.00

0.00

Quality Control

0.00

0.00

Packaging

0.00

0.00

Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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NOTE: Date & initial all entries

Work Order ID 74993

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October-14-11 10:38:47 AM

Item ID: D212-664-107 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: Stop ***NS2***
 Item Name: Crosstube Low Standard Fwd
 Start Date: 14/10/2011 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 03/11/2011 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
270		0.00							
270	Packaging								
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D212-664-107								
	<i>NEC</i>								
280		0.00							
280	QC21- Final Inspection - Work Order Release								
QC	Memo	0.00							
Quality Control									

11/11/28

11/10/31
MF
11-10-28

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

October-14-11 10:38:52 AM

Page 1

Work Order ID: 74993

74993

Parent Item: D212-664-107

D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 14/10/2011

Required Date: 03/11/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 07.09.12 EC verified by: JLM
 IPP Rev:B ECN 1100 08-01-11 DD verified by: EC
 IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec IPP Rev:D
 10.05.27 added pick kit DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-107TRN *D212-664-107TRN* Crosstube Turning Detail		Manufactured	No	B74571		140	Each	1.0000	1	1		JW 11-10-18	
				<u>Location</u>				<u>Loc Qty</u>		<u>Loc Code</u>			
				LG				1					
				67429				1					
D3659-1 *D3659-1* CUFF		Manufactured	No			220	Each	3.0000	2	2		74737	
				<u>Location</u>				<u>Loc Qty</u>		<u>Loc Code</u>			
				ST477				3					
				67005				3					
CR3212-4-06 *CR3212-4-06* CHERRY RIVET		Purchased	No			240	Each	730.0000	44	44		11/10/25	
				<u>Location</u>				<u>Loc Qty</u>		<u>Loc Code</u>			
				ST311				730					
				112492				18					
				112794				712					

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

Picklist Print

October-14-11 10:38:52 AM

Page 2

Work Order ID: 74993

74993

Parent Item: D212-664-107

D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 14/10/2011

Required Date: 03/11/2011

Start Qty: 1.00

Required Qty: 1.00

D3595-063-450

Manufactured No

240

Each

133.5600

4

4

D3595-063-450

RUBBER CUSHION

**

11/10/26

Location

Loc Qty

Loc Code

LG

107.76

67353

3

68893

6

70113

0.56

71354

0.2

74113

98

LG055

25.8

72967

25.8

MS21920-25

Purchased No

240

Each

100.0000

4

4

MS21920-25

Clamp(per MIL-DTL-8783C)

**

11/10/26

Location

Loc Qty

Loc Code

LG

44

113281

0

113282

0

118142

4

118183

40

LG050

56

116264

2

117998

4

119227

50

D2893-1

Manufactured No

240

Each

18.0000

2

2

D2893-1

2.75 Support

**

11/10/26
72865

Location

Loc Qty

Loc Code

LG052

18

~~72586~~

2

~~72865~~

16

October-14-11 10:38:52 AM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Page 3

Work Order ID: 74993

74993

Parent Item: D212-664-107

D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 14/10/2011

Required Date: 03/11/2011

Start Qty: 1.00

Required Qty: 1.00

D3428-1
D3428-1
Placard

Manufactured No

260

Each

25.0000

1 1

**

SP

Location

Loc Qty

Loc Code

ST053

25

72048

5

73498

20

1X

Purchased

No

260

Each

64.0000

4 4

**

SP

AN6-35A
AN6-35A
BOLT

Location

Loc Qty

Loc Code

ST343

64

118422

34

118838

30

4X

Purchased

No

260

Each

65.0000

4 4

**

SP 11-10-27

AN6-36A
AN6-36A
Bolt

Location

Loc Qty

Loc Code

ST343

65

118012

1

118422

34

118838

30

4X

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Work Order ID: 74993

74993

Parent Item: D212-664-107

D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 14/10/2011

Required Date: 03/11/2011

Start Qty: 1.00

Required Qty: 1.00

MS21042L6

Purchased

No

260

Each

1,792.000

6 6

MS21042I 6

**

Nut

Location

Loc Qty

Loc Code

ST300

792

117677

136

118384

8

118927

48

118968

600

ST518

1000

119075

1000

AN960JD616

NAS1149D0663J

Purchased

No

260

Each

0.0000

18 18

AN960.ID616

**

Washer

SEP 11-10-27
m 118 614

October-14-11 10:38:52 AM

Shop Packet Print

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

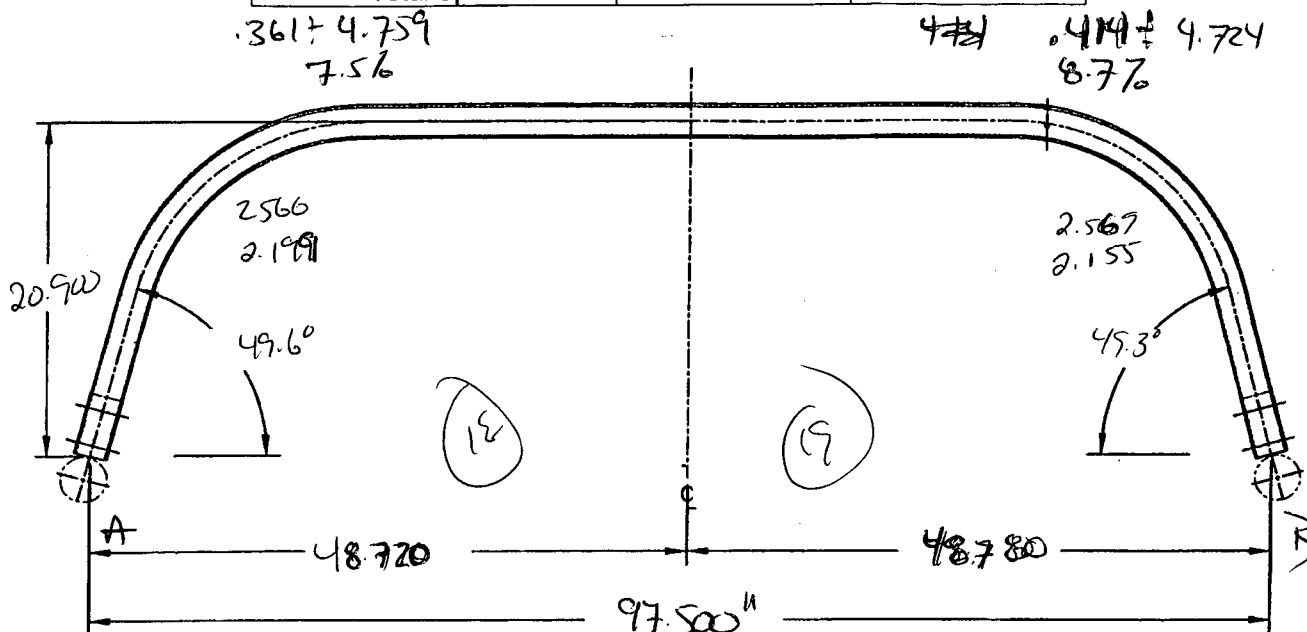
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order: 74993
Description: Crosstube Low Fwd (205/212/412)	Part Number: D212-664-107
Inspection Dwg: D212-664-147 Rev: B	Page 1 of 1

Required Dimension	Min	Max
Height	20.79	21.05
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Comments
Since A = 7.56 crushi @ 18 passes
Since B = 8.76 crushi @ 19 passes
(see note 10)

QC15 Inspection	8
Date	11/10/18

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	
B	10.01.21	Dwg Rev updated	KJ	

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	Qty -147	Qty -147B	Part Number	Description
1	X		D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
2		X	D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)
3	1	1	D6019-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	2	2	D3659-1	CUFF
7	4	4	MS21920-25	CLAMP (OR MS21920-26)
8	44	44	CR3212-4-06	RIVET (OR M7885/3-4-06)
9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTROM/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
10	A/R	A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6019-128
FINISHED LENGTH = 126.528±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF
USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-147 = 24.2 lbs (PER IIN-D212-664)
D212-664-147B = 24.2 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD
BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6%
BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER
INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS.
DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE
UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS
NOT BOTTOMED-OUT AFTER TORQUING.
- 16) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF
SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE.
SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 17) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 74993 M.C.J
11/10/14

DEO ATTACHED

Per ECW#1164
110720
UNDER REVIEW
11/10/14

RELEASED
2009-10-29
JW

B	REVISE GENERAL NOTES/PART LIST: UPDATE TO CURRENT STANDARDS: ADD -147B (ZN C4-2, D4-2)	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	REV. B	
CHECKED	RF	D212-664-147	SHEET 1 OF 4
MFG. APPR.	RF	TITLE	SCALE
APPROVED	RF	CROSSTUBE (205/212/412 LOW FWD)	NTS
DE APPR.	RF	COPYRIGHT © 2007 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
DATE	09.09.30		

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

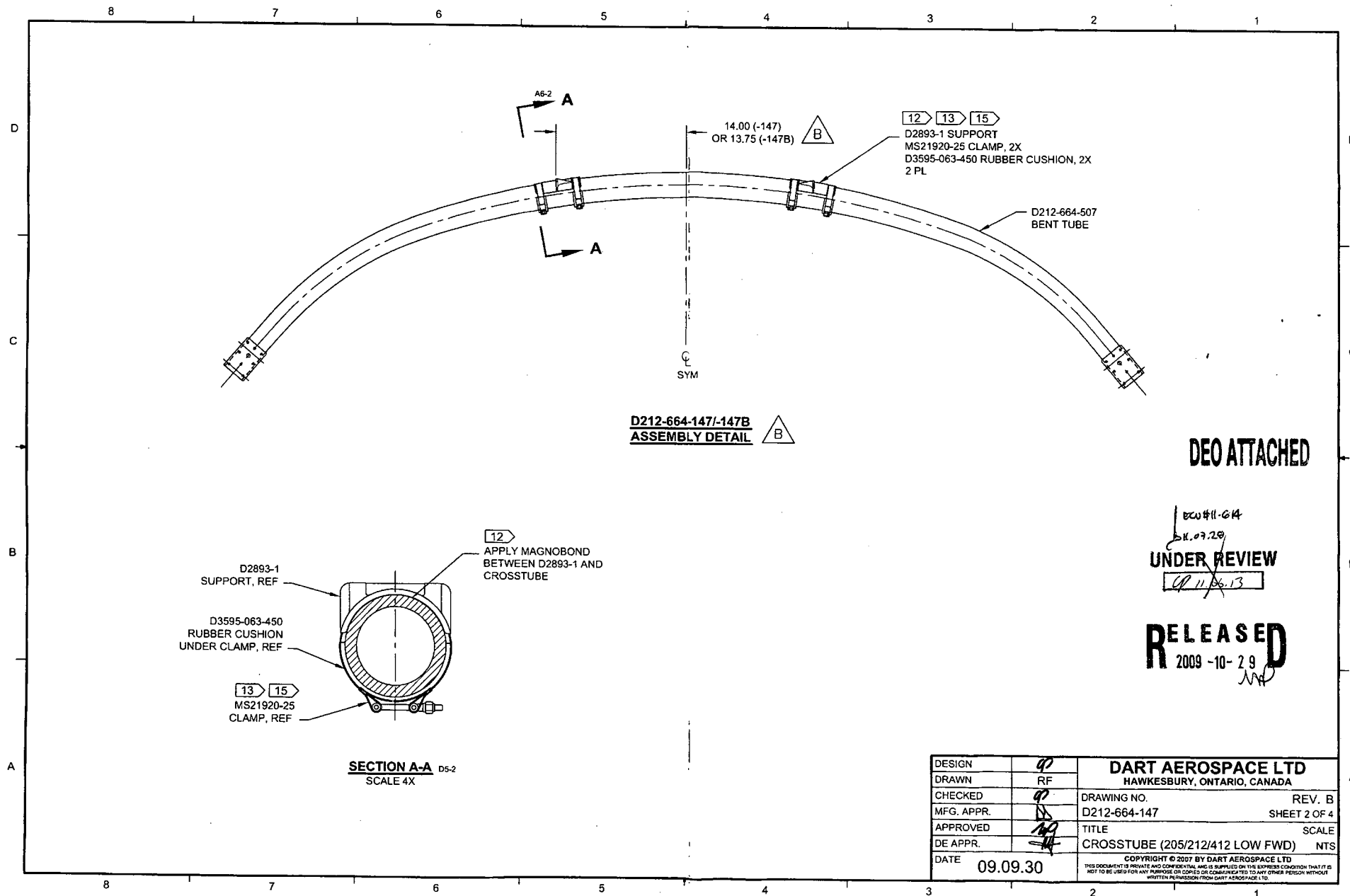
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

74993



DEO ATTACHED

BCW #11-614
21.09.20
UNDER REVIEW
09.11.13

RELEASED
2009-10-29

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

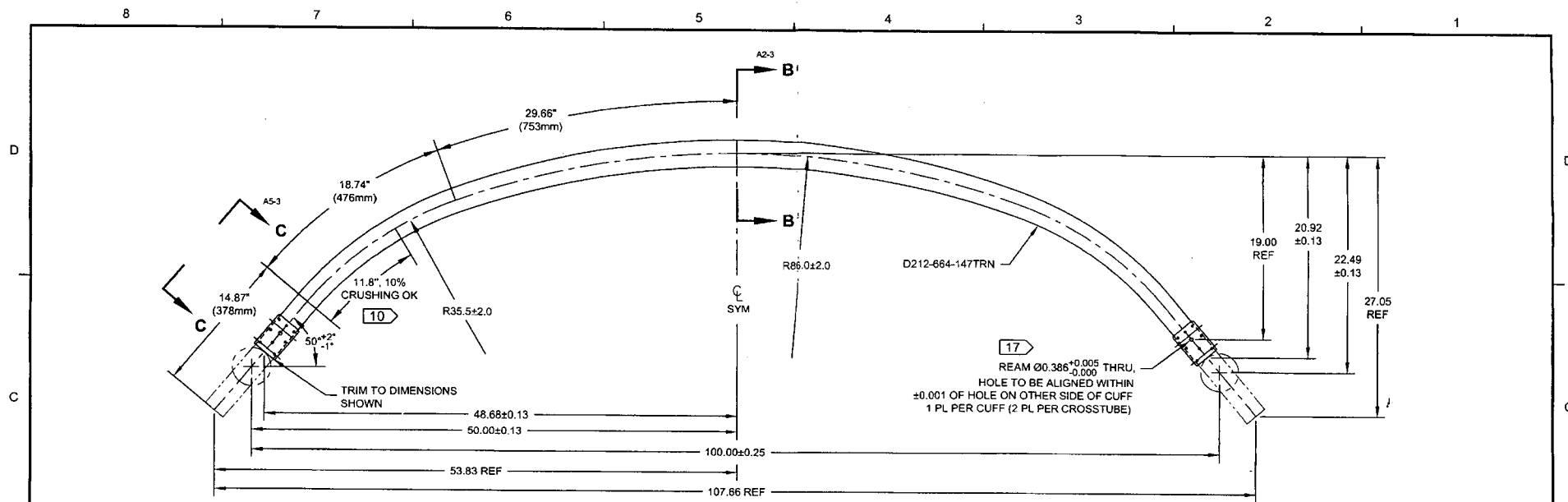
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

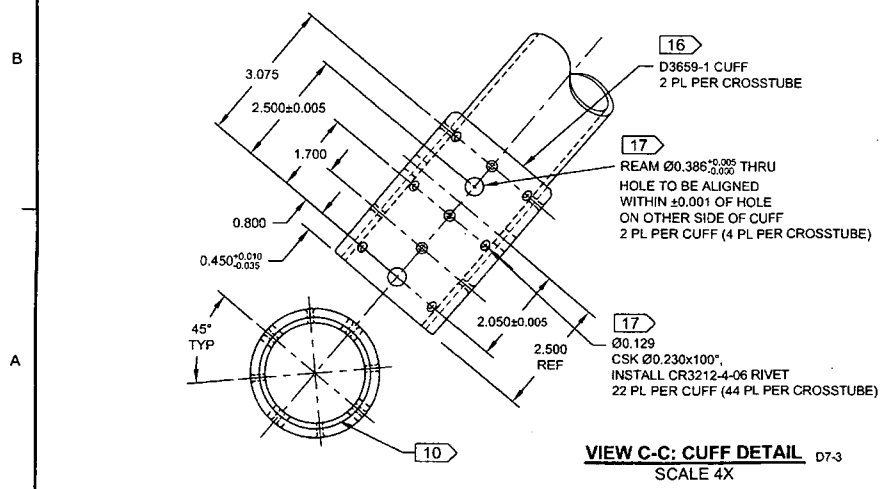
NOTE: Date & initial all entries

74993

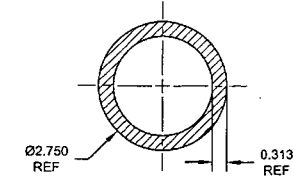


D212-664-507
BENDING AND DRILLING DETAIL 10 B

DEO ATTACHED



VIEW C-C: CUFF DETAIL D7-3
 SCALE 4X



SECTION B-B D5-3
 SCALE 4X

09.09.20
 UNDER REVIEW
09.09.13

RELEASED
 2009-10-29

DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. B
MFG. APPR.	RF	D212-664-147	SHEET 3 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (205/212/412 LOW FWD)	NTS
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

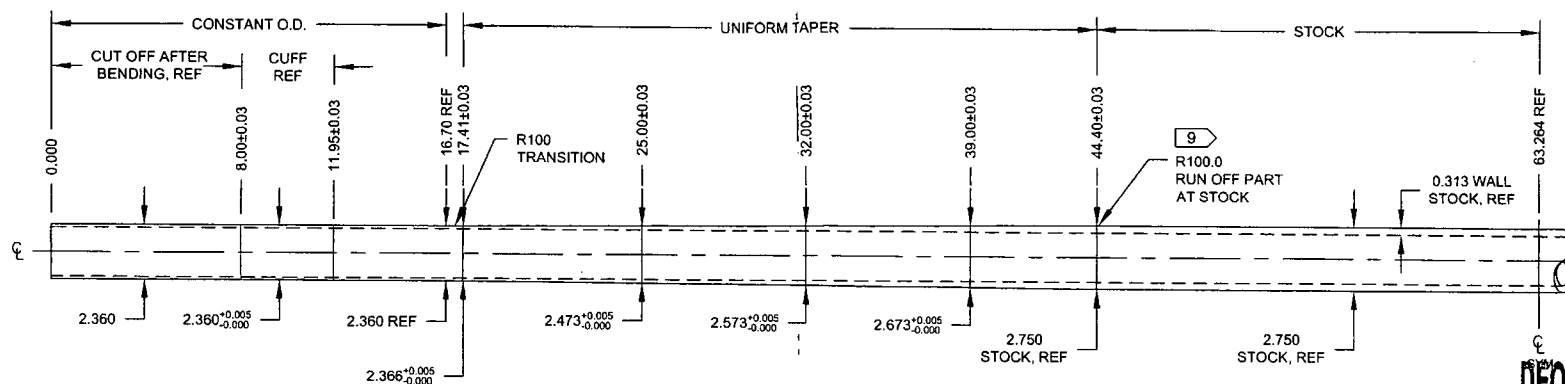
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

74993



**D212-664-147TRN
TURNING DETAIL**

DEO ATTACHED

664-11-614
11.07.26

UNDER REVIEW

RELEASED
2009-10-29

DESIGN	90	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	90	DRAWING NO.	REV. B
MFG. APPR.	DS	D212-664-147	SHEET 4 OF 4
APPROVED	90	TITLE	SCALE
DE APPR.	90	CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD	
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W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

74993

DRAWING NO. D212-664-147	TITLE CROSSTUBE ASS'Y (205 LOW FWD)	REV. B	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-147-B-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN 90	CHECKED ASS	MFG. APPR. 183	APPROVED WAF		DE APPR. M		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21		DATE 11.07.21		

PURPOSE:

REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:**IS:**

Item	Qty -147	Qty -147B	Part Number	Description
9	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	-----	----------------	---

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2893-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED
2011-07-28
WAF

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

5.2 STANDARD GEAR CROSSTUBES

Item	-107	-207	-209	Part Number	Description
	X			D212-664-107	CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
		X		D212-664-207	CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
			X	D412-664-209	CROSSTUBE INSTALLATION, 412 STANDARD AFT
6	1			D212-664-147	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
7		1		D212-664-247	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
8			1	D412-664-249	CROSSTUBE ASSEMBLY, 412 STANDARD AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			MS21042L6	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
31			2	* D2856-600-1009	ABRASION STRIP
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
45	2			* D3659-1	CUFF
46		2	2	* D3660-1	CUFF
47	44	44		* CR3212-4-06	RIVET (M7885/3-4-06)
48			44	* CR3212-4-07	RIVET (M7885/3-4-07)
50	1	1		D3428-1	PLACARD

*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-147/-247 OR D412-664-249 ASSEMBLIES ABOVE
NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AA
SKIDTUBES.

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Revision: F
Date: 08.09.05

**ACUREN****RAPPORT D'INSPECTION PAR RESSUAGE**

P-11784

PAGE 1 DE 1

CLIENT	Dart Aerospace.	DATE	24 Oct. 2011	HEURE	AM <input checked="" type="checkbox"/> PM <input type="checkbox"/>
ATTENTION	Mme. Dinda Lincelle.	N° TRAVAIL	183-11-02375		
ADRESSE	1270 Aberdeen St. Hakesburg	ACUREN			
	Ont. K6A 1K7	CLIENT POWO	1/5240		
		SITE DE TRAVAIL	Dart usine.		
		ACCEPTATION STD.	1417/OSI 038	DATE/RÉV.	05
PROJET	Crosstubes inspection and stud.				
ITEM(S) EXAMINÉ	6 x Crosstubes and 5 x studs				

DESCRIPTION DES TRAVAUX	N° PROCÉDURE	LT-002	DATE/RÉV.	2007	N° TECHNIQUE	LT-002	DATE/RÉV.	2007
-------------------------	--------------	--------	-----------	------	--------------	--------	-----------	------

N° ITEMS	MATÉRIEL	Aluminium/Steel	ÉPAISSEUR	Différent
DESCRIPTION	100% Inspection (Liquid Penetrant) on surface (external) on crosstubes (6) and surface external on stud (5)			

DÉTAILS DES INSPECTIONS

MÉTHODE :	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> LAVABLE À L'EAU	<input type="checkbox"/> MÉTHODE DISSOLVANT	<input type="checkbox"/> PRÉ-ÉMULSIONNANT
MARQUE :	Magnaflux		LUM. NOIRE S/N 16440	<input type="checkbox"/> PUISS. > 1000 µ W/cm²	<input type="checkbox"/> AMBIANT < 2 fc
PÉNÉTRANT :	Zygo ZL67	TEMPS PÉNÉTRATION MIN.	10 MIN.	ÉQUIP. LUMIÈRE	<input type="checkbox"/> LAMP. POCHÉ <input type="checkbox"/> LAMP. CULASSE <input type="checkbox"/> PUISS. > 100 fc @ SURFACE
DISSOLVANT PÉNÉTRANT	H2O	TEMPS SÉCHAGE MIN.	> 10 MIN.	AUTRES	LABINO (MODEL)
RÉVÉLATEUR	SAD-52	TEMPS PÉNÉTRATION MIN.	10 MIN.	MÈTRE LUM. N/S	DATE CAL DUE
TYPE RÉVÉLATEUR	<input checked="" type="checkbox"/> NON AQUEUX	<input type="checkbox"/> AQUEUX	<input type="checkbox"/> SEC		

SURFACE INSPECTÉE

CONDITION SURFACE	<input type="checkbox"/> MEULÉE	<input type="checkbox"/> SOUDÉE	<input type="checkbox"/> MACHINÉE	<input type="checkbox"/> GRENAILLÉE	<input checked="" type="checkbox"/> MÉTAL PROPRE
TEMPÉRATURE SURFACE	<input type="checkbox"/> < - 4°C/ 20°F	<input type="checkbox"/> - 4°C/ 20°F DE 10°C/50°F	<input checked="" type="checkbox"/> 10°C/50°F DE 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

RÉSULTATS- (☐ MÉTRIQUE ☐ IMPÉRIAL)

QTY	COMMENTAIRE	APPRÉCIATION	Item ID	Item ID
1	Crosstube WO/ID 74977	✓	D212-664-107	
1	" " " 74993	✓	" " " "	
1	" " " 74978	✓	" " " "	
1	" " " 74975	✓	" " " "	
1	" " " 74965	✓	D206 667 203	
1	" " " 75209	✓	D206 667 203 D212-664-107	
5	Studs WO/ID 73459	✓	D 3688-3	

Étendue des Services

L'entente selon laquelle le Groupe Acuren Inc. exécute les services ne concerne que les énoncés par écrit. En aucune circonstance ces services ne s'étendent au-delà de l'exécution des services demandés. Il est entendu que toutes les descriptions, les observations et les expressions d'opinions faites par Acuren reflètent les opinions ou les observations de l'entreprise fondées sur l'information et les hypothèses fournies par le propriétaire/opérateur, et elles ne constituent pas des déclarations ou des garanties ou ne peuvent être interprétées comme constituant. Le Groupe Acuren Inc. n'assume aucune des responsabilités du propriétaire/opérateur, et le propriétaire/opérateur conserve la responsabilité entière des décisions prises en matière d'ingénierie, de fabrication, de réparation et d'usage à partir de l'information ou des données fournies par Acuren en rapport avec les services décrits dans les présentes ne peuvent excéder le coût des services rendus.

Norme de Diligence

Dans l'exécution des services, le Groupe Acuren Inc. applique le degré de diligence, le soin et la compétence normalement exercés dans des circonstances semblables par d'autres fournisseurs de ce type de services opérant dans la même localité ou dans une localité similaire. Aucune autre garantie, implicite ou explicite, n'est faite ou voulue par le Groupe Acuren Inc.

SIGNATURES

REPRÉSENTANT		FTJ #	
TECHNICIEN (SIGNATURE)		RAPPORT RÉVISÉ PAR:	
NOM (MOULÉ):	PIERRE-LUC DUFOUR	NOM	INITIALES
ONGC NIVEAU	2	ONGC NIVEAU	
ONGC N° REG.	12205	ONGC N° REG.	